UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/076,350	02/19/2002	Stephen L. Morein	P290727 010007BM	1361

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EXAMINER
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ART UNIT	PAPER NUMBER
2671	7

DATE MAILED: 07/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 May 2004</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-44</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-44</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1.   This action is responsive to amendment filed 5/5/04.

2.   Claims 1-44 are pending in the application.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described
> as set forth in section 102 of this title, if the differences between the subject matter sought to
> be patented and the prior art are such that the subject matter as a whole would have been
> obvious at the time the invention was made to a person having ordinary skill in the art to which
> said subject matter pertains. Patentability shall not be negatived by the manner in which the
> invention was made.

4.   Claims 1-44 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Duluk, Jr. et al. (6,476807) in view of Duluk, Jr. et al. (6,717,576).

Claim 1, Duluk, Jr. et al. (6,476,807) discloses determining a non-depth

(alpha test, color test, stencil test; col. 13, line 67 through col. 14, line 2) of a

fragment corresponding to a pixel (col. 19, lines 56-59); determining that a

scratchpad (tile) contains an entry mapped to the pixel (visible samples; col. 20,

lines 46-59); and comparing a z value of the fragment (z or depth value) to a

value of the entry (col. 20, lines 63-67), and based on a result of the comparing

(the lesser z values), passing the fragment to a pixel pipeline (col. 40, lines 3-25),

wherein determining a non-depth conditional status of a fragment (color test)

includes determining whether incorporation of a second value of the fragment

(color value) into the pixel is conditional on a non-depth criterion (col. 21, lines

10-25); (the primitive's color at the sample location is determined. Additional

efficiency can be achieved by determining a single per-pixel color for all the

samples within the same pixel, rather than computing per-sample color (col. 21,

lines 21-25)). Duluk, Jr. et al. (6,476,807) does not teach a scratchpad (tile or

scene memory) contains an entry mapped to the pixel; however, Duluk, Jr. et al.

(6,717,576) teaches in figs. 55 and F4a, F4b show the cache (or scratchpad or

scene memory) having numbers of entries: 8, 16, 32, 64-256 to map line of texels

across prefetch buffer banks (col. 210, line 45 through col. 211, line 30). It would

have been obvious to one of ordinary skill in the art at the time the invention was

made to incorporate the entry mapped as taught by Duluk, Jr. (6,717,576) for

providing texture tile address, because performing the texture tile address to

texture memory address translation using a linear mapping of the texture tile

address into a table of texture memory, it would generate the texture for

fragments (col. 210, lines 20-29).

Claims 2 and 3, Duluk, Jr. et al. (6,476,807) does not teach a

predetermined cache replacement policy; however, Duluk, Jr. et al. (6,717,576)

discloses replacing a line of entries of the scratchpad according to a

predetermined cache replacement policy (col. 299, lines 28-29; col. 300, lines 12-

41); the second value of the fragment includes a color value (each sample has its

own color values and z value; col. 22, lines 13-14; col. 22, lines 21-54). It would

have been obvious to one of ordinary skill in the art at the time the invention was

made to incorporate the cache replacement policy and color value as taught by

Duluk, Jr. (6,717,576) for z-buffer rendering, because calculating the color value,

it would determine the visible primitive for collecting of visible samples (col. 22, lines 16-19).

Claim 4, Duluk, Jr. et al. (6,476,807) discloses determining a non-depth of a fragment includes determining a current configuration of a pixel pipeline (col. 13, line 66 through col. 14, line 2); **Claim 5**, determining a current configuration of a pixel pipeline includes determining a value of at least one state variable (col. 14, lines 1-3). **Claims 6, 7**, determining a non-depth conditional status of a fragment includes determining whether a non-depth fragment test is enabled (alpha test is enabled; col. 43, line 16). **Claims 8, 9, 21**, determining a non-depth conditional status of a fragment occurs before comparing a first value (z value) of the fragment to a value of the entry (col. 20, lines 61-64); determining a non-depth conditional status of a fragment occurs after comparing a first value (z value) of the fragment to a value of the entry (the new pixel is in front of the existing pixel: alpha test; col. 20, lines 64-67). **Claim 10**, comparing a first value of the fragment to a value of the entry includes determining whether a Z value of the fragment is less than the value of the entry (col. 18, lines 9-11). **Claim 11**, overwriting the value of the entry with the first value of the fragment (col. 20, lines 66-67). **Claim 12**, passing the fragment to a pixel pipeline (col. 19, lines 3-4). **Claim 13**, determining that a scratchpad (tile) contains an entry mapped to the pixel includes determining that the entry is valid; **Claim 14**, determining a scratchpad contains an entry mapped to the pixel includes determining the scratchpad contains a line of entries, the line being mapped to a block of pixels that includes the pixel; **Claim 15**, determining that the scratchpad contains a line

of entries includes determining that the line is valid (figs. 13A-13C). **Claims 16,**

17, initializing a value of each among the line of entries to the backmost among a

set of Z values (col. 33, lines 26-41). **Claim 18**, comparing the first value of the

fragment to a representative Z value corresponding to the fragment; **Claim 19**,

overwriting the representative Z value (col. 20, lines 63-67).

Claim 20, Duluk, Jr. et al. (6,476,807) does not teach a scratchpad (tile or

scene memory) contains an entry mapped to the pixel; however, Duluk, Jr. et al.

(6,717,576) teaches in figs. 55 and F4a, F4b show the cache (or scratchpad or

scene memory) having numbers of entries: 8, 16, 32, 64-256 to map line of texels

across prefetch buffer banks (col. 210, line 45 through col. 211, line 30);

determining that a scratchpad contains an entry mapped to the pixel includes

determining that the scratchpad contains a line of entries, the line being mapped

to a block of pixels that includes the pixel (col. 210, line 45 through col. 211, line

30), and wherein overwriting the representative Z value includes comparing the

representative Z value with the backmost Z value (z-far and z-near of the line

(col. 174, lines 57-64). It would have been obvious to one of ordinary skill in the

art at the time the invention was made to incorporate the entry mapped and

backmost z value as taught by Duluk, Jr. (6,717,576) for performing z cull,

because it would improve sorted transparency mode (col. 174, lines 25-35).

Claims 22, 23, Duluk, Jr. et al. (6,476,807) discloses initializing the value of

the entry to an initial value (initialized to zero at the start of the pass; col. 33, lines

24-25); the initial value is a maximum Z value (zfar value). **Claim 24**, the initial

value is the backmost among a set of Z values; **Claim 25**, the initial value is the

backmost among a set of representative Z values. **Claim 26**, the initial value is a

representative Z value corresponding to a location to which the entry is mapped

(col. 33, lines 26-40).

Claims 27-32, 35, 37, the rationale provided in the rejection of claims 1, 2,

3, 6, 16, 17 is incorporated herein.

Claim 33, Duluk, Jr. et al. (6,476,807) discloses altering a portion of the

scratchpad includes storing the first value of the fragment to the entry (in the z

buffer); **Claim 34**, mapping a line of the scratchpad (tile) to a block of pixels

(stamp) that includes the pixel (figs. 13A-13C).

Claims 36, and 38-44, the rationale provided in the rejection of claim 1 is

incorporated herein. In addition Duluk, Jr. et al. (6,476,807) teaches determining

an occlusion status of the fragment and the procedure of early culling (col. 28,

line 43 through col. 29, line 56; fig. 12; col. 35 through col. 42, line 26).

Response to Arguments

5.   Applicant's arguments filed 5/5/04 have been fully considered but they are

not persuasive, because Duluk, Jr et al. (6,717,576) teaches a scratchpad or

scene memory or cache containing entry map, and both references of Duluk, Jr

also teach comparing z value and pass the pixel to a pipeline (see the office

action).

6.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Kimbinh Nguyen** whose telephone number is **(703) 305-9683**. The examiner can normally be reached **(Monday-Thursday from 7:00 AM to 4:30 PM and alternate Fridays from 7:00 AM to 3:30 PM)**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman, can be reached at (703) 305-9798.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
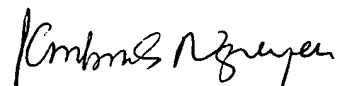
Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to Crystal Part II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

July 15, 2004

Kimbinh Nguyen

Patent Examiner AU 2671